

**REMARKS**

By this Amendment, Claims 1, 8 and 30 have been amended; Claims 28 and 29 have been canceled without prejudice to or disclaimer of the subject matter recited therein, and new Claims 32-36 have been added, thereby leaving Claims 1, 3-10, 21, 23, 25, 27 and 30-36 pending. Reconsideration of the December 2, 2003 Official Action is respectfully requested in light of the above amendments and the following remarks.

**1. Personal Interview**

Applicants thank Examiner Alejandro for the courtesies extended to the undersigned during the personal interview held on February 19, 2004. During the interview, the rejection under 35 U.S.C. § 112, ¶1, and the Declaration by Jerome S. Hubacek Under 37 C.F.R. § 1.132 ("the Hubacek Declaration") submitted with the Amendment filed on October 7, 2003, were discussed. The substance of the interview is incorporated in the following remarks.

**2. Restriction Requirement**

The Official Action has withdrawn Claim 31 from consideration as allegedly being directed to a non-elected invention. It is asserted in the Official Action that Claim 31 "is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: it is directed to a patentably distinct embodiment than the one claimed in dependent claim 8." Applicants respectfully submit that the restriction requirement is improper.

Claim 8 is directed to a plasma etch reactor including an electrode, while Claim 31 is directed to an electrode. Claim 8 encompasses embodiments where the elastomeric material between the electrode and graphite backing plate is provided, e.g., in thin beads, as recited in Claim 31. The relationship between Claim 8 ("combination") and Claim 31 ("sub-combination") can be written  $AB_{sp}/B_{sp}$ , where "sp" means "specific." See MPEP § 806.05(c)(II) (page 800-43, Feb. revision). Applicants submit that the Patent Office has not

established the criteria for a restriction requirement set forth in this section of the MPEP and, accordingly, the requirement is improper.

Also, claims directed to the plasma etch reactor and claims directed to the electrode were originally presented in the application, and were acted upon by the Patent Office on their merits. As explained at MPEP § 818.02(a), "the claims originally presented and acted upon by the Office on their merits determine the invention elected by an applicant in the application ...." Accordingly, Claim 31 clearly is directed to the elected invention. Also, because Claim 31 is directed to an electrode, it is not directed to a patentably distinct embodiment of the plasma etch reactor recited in Claim 8.

Accordingly, it is respectfully requested that the restriction requirement be withdrawn and Claim 31 be rejoined and examined on the merits. Alternatively, upon allowance of independent Claim 21, rejoinder and allowance of Claim 31 is requested.

**3. Rejection Under 35 U.S.C. § 112, ¶1**

Claims 1, 3-10, 21, 23, 25 and 27-29 stand rejected under 35 U.S.C. § 112, ¶1. The reasons for the rejection are stated on pages 2-3 of the Official Action. The rejection is respectfully traversed.

Claim 1 recites the feature of "the electrode having a thickness of about 0.3 inch to 0.5 inch." The Official Action asserts that the specification fails to provide support for this feature. Applicants respectfully disagree. In the Amendment filed on October 7, 2003, Applicants provided arguments directed to the reasons that the present specification does support this claimed feature. The remarks included in the October 7, 2003 Amendment are incorporated herein by reference. In support of their position, Applicants cited *Ultradent Products Inc. v. Life-Like Cosmetics*, 44 USPQ2d 1336 (Fed. Cir. 1997), in which the Court of Appeals for the Federal Circuit decided that the phrase "which patent is hereby incorporated by reference" has the effect of incorporating the entire contents of the patent in the referencing patent. The Federal Circuit refuted the argument that only the portion of the

contents of the incorporated patent that is specifically referred to in the referencing patent is incorporated by reference therein. *Ultradent* supports Applicants' argument that the entire disclosure of U.S. Patent No. 5,074,456 to Degner et al. has been incorporated by reference in the present specification, and thus the claimed feature of "the electrode having a thickness of about 0.3 inch to 0.5 inch" is supported by the present specification.

However, the Official Action fails to address the arguments regarding *Ultradent* that were included in the October 7, 2003, Amendment. That is, the remarks set forth at page 16, line 1 to page 17, line 5 of the Official Action were included in the Official Action mailed May 20, 2003, prior to the October 7, 2003 Amendment.

Second, the Official Action fails to address the argument included in the October 7, 2003 Amendment that the entire disclosure of Degner has been incorporated by reference in the present specification by the description at page 1, lines 8-17, of the present specification.

Third, the Official Action fails to address the argument presented in the paragraph bridging pages 9 and 10 of the October 7, 2003 Amendment that the entire disclosure of Degner has been incorporated by reference in the present specification according to the provisions of MPEP § 201.06(c) (page 200-37, Feb. 2003).

MPEP § 707.07(f) (page 700-113, Feb. 2003) states that "[w]here the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it" (emphasis added). Accordingly, it was improper for the Official Action not to have answered all of the arguments presented in the October 7, 2003 Amendment that pertain to this rejection. Applicants respectfully request that all of those arguments be answered in the Patent Office's response to this Amendment, should this rejection improperly be maintained.

For the foregoing reasons, and also the reasons included in the October 7, 2003 Amendment, withdrawal of the rejection under 35 U.S.C. § 112, ¶1, is respectfully requested.

4. **First Rejection of Claims 1, 4-10, 21, 23, 25 and 27-30**

**Under 35 U.S.C. § 103**

Claims 1, 4-10, 21, 23, 25 and 27-30 stand rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,074,456 to Degner et al. ("Degner") in view of JP 2-20018 ("Murai"). The reasons for the rejection are stated on pages 3-5 of the Official Action. Claims 28 and 29 have been cancelled. This rejection is respectfully traversed.

Claim 1, as amended, recites "a low resistivity silicon electrode adapted to be mounted in a plasma reaction chamber used in semiconductor substrate processing, comprising: a silicon electrode comprising a showerhead electrode having a plurality of gas outlets arranged to distribute process gas in the plasma reaction chamber during use of the showerhead electrode, the electrode having a thickness of about 0.3 inch to 0.5 inch and an electrical resistivity of less than 1 ohm-cm, ...; and a graphite backing plate elastomer bonded to the electrode" (emphasis added). Support for the amendments to Claim 1 is provided, for example, in Claim 25.

Independent Claim 21 recites "a low resistivity silicon electrode adapted to be mounted in a plasma reaction chamber used in semiconductor substrate processing, comprising: a silicon electrode comprising a showerhead electrode having a plurality of gas outlets arranged to distribute process gas in the plasma reaction chamber during use of the showerhead electrode, the electrode having a thickness of about 0.3 inch to 0.5 inch and an electrical resistivity of less than 1 ohm-cm ...; and a backing plate elastomer bonded to the electrode" (emphasis added).

Independent Claim 30, as amended, recites "a low resistivity silicon electrode adapted to be mounted in a plasma reaction chamber used in semiconductor substrate processing, comprising: a silicon electrode comprising a showerhead electrode having a plurality of gas outlets arranged to distribute process gas in the plasma reaction chamber during use of the showerhead electrode, the electrode having a thickness of about 0.375

inch to 0.5 inch and an electrical resistivity of less than 1 ohm-cm ...; and a graphite backing plate elastomer bonded to the electrode” (emphasis added). The combination of Degner and Murai fails to disclose or suggest the subject matter recited in Claims 1, 21 and 30 for the following reasons.

The Official Action acknowledges that Degner does not disclose or suggest that the electrode 12 is a single crystal silicon electrode having an electrical resistivity of less than 0.05 ohm-cm, as recited in Claim 1. However, it is alleged that Murai discloses a single crystal silicon electrode having an electrical resistivity of less than 0.05 ohm-cm, and that it would have been obvious to modify Degner's apparatus to include an electrode having such electrical resistivity. Applicants respectfully disagree with these assertions.

Murai is silent regarding the thickness of the electrode, and thus cannot suggest selecting the particular thickness of Degner's electrode plate of about 0.3 inch to 0.5 inch, as recited in Claims 1 and 21, or the particular electrode thickness of about 0.375 inch to 0.5 inch, as recited in Claim 30, and also modifying Degner's electrode plate of that thickness to have an electrical resistivity of less than 1 ohm-cm, as recited in Claims 1, 21 and 30.

Because Degner and Murai fail to disclose or suggest the subject matter recited in Claims 1, 21 and 30, the Official Action has not established a *prima facie* case of obviousness regarding the subject matter recited in these claims. See MPEP § 2143. Accordingly, the Official Action also has not established a *prima facie* case of obviousness regarding the subject matter recited in dependent Claims 4-10 and 27, and in dependent Claim 23, for at least the same reasons as those for Claims 1 and 21, respectively. Therefore, Claims 1, 4-10, 21, 23, 25 and 27-30 are patentable over the applied references.

5. **The Claimed Subject Matter Provides Unexpected Superiority Over the Prior Art**

The Hubacek Declaration provides evidence of the unexpected superiority of the claimed subject matter as compared to the prior art; particularly, the claimed low resistivity, silicon electrode provides (a) a reduced center-to-edge temperature gradient; (b) an increased lifetime; (c) reduced byproduct deposition behind the electrode; and (d) reduced electrical resistance. Despite the showing of unexpected superiority provided by the Hubacek Declaration, in the paragraph bridging pages 17 and 18 of the Official Action, it is asserted that:

[T]he attempted showing of unexpected results in the declaration filed 10/7/03 is not commensurate in scope with many of the claims. For example, the electrodes tested at the variety of thicknesses have gas passages of 0.025 inches and were bonded to a graphite support by an elastomer joint. These limitations are not stated in many of the claims.

Applicants respectfully disagree with these assertions. Amended Claims 1 and 30 each recite a graphite backing plate elastomer bonded to the electrode. Accordingly, the assertions in the Official Action regarding this feature are moot with respect to these claims.

Independent Claim 21 recites "a backing plate elastomer bonded to the electrode." Because the electrodes that were tested included a backing plate elastomer bonded to the electrode, the test results provided in the Hubacek Declaration are clearly commensurate with the scope of Claim 21.

The Official Action correctly states that Claims 1, 21 and 30 do not recite that the gas outlets of the electrode have a diameter of 0.025 inch. However, the outlet size was the same in the tested electrodes and is therefore not the feature responsible for the unexpected results. As explained below, because the showing of unexpected results provided in the Hubacek Declaration is commensurate in scope with the subject matter recited in independent Claims 1, 21 and 30, there is no need to recite the particular electrode diameter of 0.025 inch in any one of Claims 1, 21 and 30.

First, as explained in the Hubacek Declaration, the electrodes that were tested each had the same gas outlet diameter of 0.025 inch and each also included an elastomer bonded graphite backing plate. The only parameter of the electrodes that was varied in the testing was the electrode thickness. Thus, because each of the tested electrodes had the same gas outlet diameter and included a graphite backing plate elastomer bonded to the electrode, neither one of these two features contributed to the showing of unexpected results demonstrated by the electrodes. Rather, the Hubacek Declaration clearly established that it was the claimed electrode thickness that provided the unexpected results.

The electrode thickness is recited in Claims 1, 21 and 30. The Official Action has failed to provide any reasoning or cite any legal authority in support of the allegation that the 0.025 inch diameter of the gas outlets of the tested electrodes contributed to the showing of unexpected results detailed in the Hubacek Declaration.

The Official Action has failed to cite any authority that supports the assertion that the feature of a gas outlet diameter of 0.025 inch must also be recited in Claims 1, 21 and 30 in order for these claims to be commensurate in scope with the test results provided in the Hubacek Declaration. To the contrary, in In re Merchant, 197 USPQ 785, 788 (CCPA 1978), the Court of Customs and Patent Appeals refuted the solicitor's argument that a Declaration Under 37 C.F.R. 1.132 was irrelevant, stating that "the 'feature' responsible for appellant's unexpected results is recited in the claims ...." (Emphasis added.) 197 USPQ at 788. Accordingly, because Claims 1, 21 and 30 each recite the feature that was responsible for the unexpected results demonstrated by the test results, i.e., the electrode thickness, the test results provided by the Hubacek Declaration are commensurate in scope with the claimed subject matter. Thus, it is respectfully submitted that the rebuttal evidence provided by the Hubacek Declaration must be weighed against the asserted case of *prima facie* obviousness.

**A. Reduction of Center-to-Edge Temperature Gradient of Electrode and Improvement of Showerhead Electrode Lifetime**

As explained in the Hubacek Declaration, low resistivity, single crystal silicon showerhead electrodes having thicknesses of 0.15 inch, 0.18 inch, 0.25 inch, and 0.35 inch, were compared. The comparative results plotted in the graph in Appendix A attached to the Hubacek Declaration show that *at each applied power level*, the center-to-edge temperature gradient decreases as the showerhead electrode thickness increases. Reducing the temperature gradient surprisingly reduces the probability of cracking of the electrode, especially at high power levels, such as 4000 watts.

Because the prior art fails to recognize the cracking problem solved by the claimed thicker electrode, the prior art could not have suggested a solution to the cracking problem.

As stated in In re Shaffer, 108 USPQ 326, 329 (CCPA 1956):

[A] person having the references before him who was not cognizant of appellant's disclosure would not be informed that the problem solved by appellant ever existed. Therefore, can it be said that these references which never recognized appellant's problem would have suggested its solution?

The Hubacek Declaration also explained that increasing the showerhead electrode thickness increases the lifetime of the electrode, i.e., the number of RF hours that the electrode can be operated for without failing. The relationship between showerhead electrode thickness and the power level applied to the electrode is plotted in the graph in Appendix B attached to the Hubacek Declaration. By extrapolating Line A in the graph to higher electrode thickness values, it can be seen that showerhead electrodes having a thickness of 0.30 inch or greater, e.g., 0.35 inch, 0.375 inch, or greater (and thus falling within the electrode thickness range of 0.3 to 0.5 inch recited in Claim 1) can be operated at significantly higher power levels than electrodes having a thickness of 0.25 inches or less, which is outside of the range recited in Claim 1. The prior art fails to recognize the advantage that thicker electrodes can be operated at higher power levels than thinner electrodes can tolerate.



Despite these unexpected results, the Official Action asserts that:

[T]he fact that a thicker electrode results in a decreased center to edge temperature gradient is an expected result rather than an unexpected result. The results shown are typical based on known physics and heat transfer laws. Furthermore, one would expect that a thicker electrode would be harder to crack since it is thicker. This is also an expected rather than an unexpected result.

However, the Official Action has provided no evidentiary basis that supports the assertion that the test results in the Hubacek Declaration are “typical” and “expected” rather than unexpected. Unsupported statements by the U.S.P.T.O. (“Patent Office”) cannot take the place of evidence. The Federal Circuit has criticized such approaches taken by the Patent Office in situations, such as the present situation, where there was no evidentiary support in the record. See, e.g., Dickinson v. Zurko, 50 USPQ2d 1930 (Fed. Cir. 1999) and In re Lee, 61 USPQ2d 1430 (Fed. Cir. 2002). In Lee, the Federal Circuit reversed a decision by the Patent Office Board of Patent Appeals and Interferences (“Board”) sustaining a rejection under 35 U.S.C. § 103, where the Board had determined that it was not necessary to present a source of a teaching, suggestion or motivation to combine the references. The Federal Circuit stated:

‘[C]ommon knowledge and common sense’ on which the Board relied in rejecting Lee’s application are not the specialized knowledge and expertise contemplated by the Administrative Procedure Act. Conclusory statements such as those here provided do not fulfill the agency’s obligation. ... The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies. 61 USPQ2d at 1434-35.

MPEP § 2144.04(C) states that if an applicant challenges a factual assertion by the Patent Office as not being properly based upon “common knowledge,” the Examiner must support the finding with adequate documentary evidence. Accordingly, should the Examiner improperly decide to maintain this rejection, the Examiner must provide documentary evidence regarding the alleged “known physics and heat transfer laws” so that Applicants can evaluate such evidence under the standard of patentability that was articulated by the

U.S. Supreme Court in Graham v. Deere. MPEP § 2141 states that "Patent examiners carry the responsibility of making sure that the standard of patentability enunciated by the Supreme Court and Congress is applied in each and every case." For example, the Patent Office can only rely on analogous prior art under 35 U.S.C. § 103. See MPEP § 2141.01(a).

**B. Reduction of Byproduct Deposition Behind Electrode and Reduction of Electrical Resistance of Electrode**

The Hubacek Declaration further explained that increasing the showerhead electrode thickness increases the length of the gas passages and also increases the pressure behind the electrode. The showerhead electrode having a thickness of 0.35 inch reduces backstreaming, i.e., the deposition of particle defects behind the electrode, as compared to the electrodes having a thickness of 0.15 inch, 0.18 inch, and 0.25 inch, which fall outside of the thickness range recited in Claims 1, 21 and 30. The prior art clearly fails to recognize the advantage of thicker electrodes in reducing by-product deposition.

The Hubacek Declaration also explained that increasing the thickness of the showerhead electrode decreases its electrical resistance. As a result, ohmic losses in the electrode are reduced, and coupling of radio frequency (RF) power to the plasma reactor is enhanced. Reducing the impedance path of the RF provides for a higher etch rate of substrates in the plasma reactor at a set power level applied to the electrode. Surprisingly, the etch uniformity was as good as, or better than, a lower resistance electrode, e.g., a thinner electrode. Also, reducing the electrode resistance improves plasma confinement in the plasma reactor. See page 5, lines 2-8, of the specification. Such advantages are not recognized in the applied references.

However, regarding these unexpected results, the Official Action asserts at page 18, lines 6-8, that "such statements are largely unsupported statements that are not backed up by supplementary evidence and therefore these statements are insufficient to establish unexpected results." As explained at MPEP § 716.01(d), page 700-239, "each piece of rebuttal evidence should not be evaluated for its ability to knockdown the *prima facie* case.

All of the competent rebuttal evidence taken as a whole should be weighed against the evidence supporting the *prima facie* case" (emphasis added). Accordingly, the statements set forth at paragraphs 5 and 6 of the Hubacek Declaration regarding the reduction of byproduct deposition behind thick electrodes, and the reduction of electrical resistance of thick electrodes, should not be evaluated individually for their ability to knockdown the *prima facie* case, but should be weighed as part of the evidence as a whole.

Applicants respectfully submit that the comparative results provided in the Hubacek Declaration are sufficient to rebut the alleged *prima facie* case of obviousness based on the combination of Degner and Murai. Accordingly, it is respectfully submitted that the subject matter recited in Claim 1 is patentable. Dependent Claims 4-10 and 27 are also patentable over the combination of Degner and Murai for at least the same reasons that Claim 1 is patentable.

Claims 21 and 30 also are patentable over the combination of Degner and Murai for reasons stated above.

Withdrawal of the rejection is therefore respectfully requested.

**6. First Rejection of Claim 3 Under 35 U.S.C. § 103**

Claim 3 stands rejected under 35 U.S.C. § 103(a) over Degner in view of Murai, and further in view of U.S. Patent No. 5,993,597 to Saito et al. ("Saito"). The reasons for the rejection are stated on page 6 of the Official Action. The rejection is respectfully traversed.

Claim 3 recites the feature of "the gas outlets have diameters of 0.020 to 0.030 inch and the gas outlets are distributed across the exposed surface." It is acknowledged in the Official Action that Degner and Murai fail to disclose the diameter of the gas outlets as recited in Claim 3. However, it is asserted that Saito teaches this omission and that it would have been obvious to modify Degner in view of Murai to achieve the claimed invention. Applicants respectfully disagree.

Saito not only fails to disclose or suggest an electrode thickness of about 0.3 inch to 0.5 inch, Saito's electrode is thinner than a conventional 0.25 inch electrode. Accordingly, Saito teaches away from the combination of features recited in Claim 3, and thus, like Murai, provides no motivation to select the particular thickness of Degner's electrode plate of about 0.3 inch to 0.5 inch, as recited in Claim 1. Thus, dependent Claim 3 also is patentable over the combination of Degner, Murai and Saito for at least the same reasons that Claim 1 is patentable.

Therefore, withdrawal of the rejection is respectfully requested.

7. **Second Rejection of Claims 1, 4-10, 21, 23, 25 and 27-30**

**Under 35 U.S.C. § 103**

Claims 1, 4-10, 21, 23, 35 and 27-30 stand rejected under 35 U.S.C. § 103(a) over Murai in view of Degner. The reasons for the rejection are stated on pages 6-9 of the Official Action. This rejection is respectfully traversed.

As explained above, Murai is silent regarding the thickness of the disclosed electrode. Thus, Murai does not suggest at least an electrode thickness of about 0.3 inch to 0.5 inch, as recited in Claims 1 and 21, or an electrode thickness of about 0.375 inch to 0.5 inch, as recited in Claim 30.

Also, Degner discloses a *showerhead electrode assembly* 10 that has a different construction than Murai's apparatus, which does not include a showerhead electrode. The asserted modification of Murai's apparatus would require its substantial reconstruction and redesign and would substantially change its principle of operation. Furthermore, modifying Murai's silicon electrode by increasing its thickness would not achieve the claimed subject matter, but would still result in a non-showerhead electrode. A showerhead electrode would be unsuitable for incorporation in Murai's apparatus because Murai's particular apparatus design uses a different electrode construction. For at least these reasons, the applied references do not render the claimed subject matter *prima facie* obvious.

It is asserted in the Official Action that "Degner et al. does not change the principle of operation of Murai since modifying Murai with Degner et al. would still allow for Murai to be used as an electrode consistent with the teachings of Murai" (emphasis added). However, this assertion ignores the facts that (a) Claims 1, 21 and 30 each recite a "showerhead electrode" and (b) Murai's electrode is not a showerhead electrode. Murai's apparatus is based on a different principle of operation that does not utilize a showerhead electrode. The Official Action has not stated sufficient motivation for one having ordinary skill in the art to undertake the substantial redesign that would be required to modify Murai's electrode to produce a showerhead electrode, especially because such resulting showerhead electrode still would be inappropriate for Murai's apparatus, which includes a different electrode construction compatible with its gas supply system having a gas supply tube 4. The asserted modification of Murai in view of Degner relies entirely on hindsight derived from Applicants' present disclosure.

Also, the unexpected results presented in the Hubacek Declaration that are achieved by the subject matter recited in Claim 1 rebut any alleged *prima facie* case of obviousness over the combination of Murai and Degner. Accordingly, Claim 1 also is patentable over the applied references. Therefore, withdrawal of the rejection is respectfully requested.

Dependent Claims 4-10 and 27 also are patentable over the combination of Murai and Degner for at least the same reasons that Claim 1 is patentable. The subject matter recited in independent Claim 21 and in dependent Claims 23 and 25, and in independent Claim 30 also is patentable over the applied references.

Therefore, withdrawal of the rejection is respectfully requested.

**8. Second Rejection of Claim 3 Under 35 U.S.C. § 103**

Claim 3 stands rejected under 35 U.S.C. § 103(a) over Murai in view of Degner, and further in view of Saito. The reasons for the rejection are stated on page 9 of the Official Action. This rejection is respectfully traversed.

As explained above, Murai's apparatus does not include a showerhead electrode. Degner and Saito provide no motivation to modify Murai's electrode to produce a showerhead electrode, much less a showerhead electrode comprising the combination of features recited in Claim 1. Therefore, dependent Claim 3 also is patentable over the combination of Murai, Degner and Saito for at least the same reasons that Claim 1 is patentable.

Therefore, withdrawal of the rejection is respectfully requested.

**9. Third Rejection of Claims 1, 3-10, 21, 23, 25 and 27-30**

**Under 35 U.S.C. § 103**

Claims 1, 3-10, 21, 23, 25 and 27-30 stand rejected under 35 U.S.C. § 103(a) over Saito in view of Degner. The reasons for the rejection are stated on pages 10-13 of the Official Action. The rejection is respectfully traversed.

As acknowledged in the Official Action, Saito does not suggest an electrode having a thickness of about 0.3 to 0.5 inches. However, it is asserted in the Official Action that it would have been obvious to modify Saito's electrode in view of Degner to have a thickness of about 0.3 to 0.5 inches. However, for reasons stated above, including that Saito discloses an electrode that is even thinner than a conventional electrode, Degner fails to suggest modifying Saito to provide the silicon electrode recited in Claim 1. Also, the unexpected results presented in the Hubacek Declaration that are achieved by the subject matter recited in Claim 1 rebut any alleged *prima facie* case of obviousness over the combination of Saito and Degner. Thus, Claim 1 is patentable over Saito and Degner.

Dependent Claims 3-10 and 27 also are patentable over the cited references for at least the same reasons that Claim 1 is patentable. Independent Claim 21 and dependent Claims 23 and 25, and independent Claim 30 also are patentable over the applied references for reasons stated above.

Therefore, withdrawal of the rejection is respectfully requested.

**10. Fourth Rejection of Claims 1, 3-10, 21, 23, 25 and 27-30****Under 35 U.S.C. § 103**

Claims 1, 3-10, 21, 23, 25 and 27-30 stand rejected under 35 U.S.C. § 103(a) over Degner in view of Saito. The reasons for the rejection are stated on pages 13-15 of the Official Action. The rejection is respectfully traversed.

As acknowledged in the Official Action, Degner fails to disclose a single crystal silicon electrode having an electrical resistivity of less than 0.05 ohm-cm. However, it is asserted in the Official Action that Saito discloses this claimed feature and that it would have been obvious to modify Degner's electrode to have the recited electrical resistivity.

Applicants respectfully submit that Saito does not suggest modifying Degner's electrode plate to produce a silicon electrode having both the electrical resistivity and thickness recited in Claim 1. Also, the unexpected results presented in the Hubacek Declaration that are achieved by the subject matter recited in Claim 1 rebut any alleged *prima facie* case of obviousness over the combination of Degner and Saito. Thus, Claim 1 is patentable over these references.

Dependent Claims 3-10 and 27, and independent Claim 30, also are patentable over Degner and Saito for at least the same reasons that Claim 1 is patentable. Independent Claim 21 and dependent Claims 23 and 25 also are patentable for reasons stated above.

Therefore, withdrawal of the rejection is respectfully requested.

**11. New Claims**

New Claims 32 and 33 depend from Claims 21 and 30, respectively, and recite that "the gas outlets have diameters of 0.020 to 0.030 inch and the gas outlets are distributed across the exposed surface."

New Claims 34-36 depend from Claims 3, 32 and 33, respectively, and recite that "the gas outlets have a diameter of about 0.025 inch to about 0.028 inch." In contrast, Saito

discloses a hole diameter of 0.5 mm, which is less than 0.2 inch. Saito fails to suggest the claimed gas outlet diameter.

Applicants respectfully submit that the subject matter recited in Claims 32-36 also is patentable for at least the same reasons that the claims from which they depend are patentable.

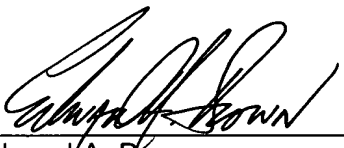
**12. Conclusion**

For the foregoing reasons, withdrawal of the rejections and prompt allowance of the application are respectfully requested.

Respectfully submitted,

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Date: 3/2/04

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